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**JICST AND ACCESS TO INFORMATION ON JAPANESE SCIENCE
AND TECHNOLOGY IN THE UNITED STATES.**

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June 10, 1987

**JICST and Access to Information on Japanese Science
and Technology in the United States.**

The Japan Information Center of Science and Technology (JICST) founded in 1957 was established to coordinate Japan's gathering and dissemination of information for the advancement of science and technology. The center is a non-profit organization under the executive control of the Science and Technology Agency, Prime Minister's office.

JICST is financed by revenue from subscription and service fees and from government support.

I. Collection

JICST collects information from over 50 countries throughout the world. JICST collects serial publications, technical reports, conference papers, etc. Following is a breakdown of the contributing countries, the areas of science and technology being collected and the various sources:

Materials collected in 1986-

Foreign journals	6,200 titles
Domestic journals	5,700 "
Conference proceedings	750 "
Technical reports	28,000 "
Data file for literature retrieval (introduced database)	17 databases
Public materials	3,700 titles

Journal titles by country (percentage)

Japan	47.5%
U.S.A.	18.7%
U.K.	9.8%
F.R. Germany	5.3%
U.S.S.R.	3.1%
France	2.2%

Journal titles by subject (percentage)

Biochemistry, Medicine, Agriculture and Life Sciences	33.6%
Chemistry	10.3%
Mechanical Engineering	9.4%
Electrical Engineering and Electronics	6.5%

II. Abstracting and Indexing

From the above sources, 130 specialists and about 4000 consultants or associates process the approximately 525,000 abstracts collected per year into a coherent database. To carry out this task, JICST operates from their head office in Tokyo, 10 branch offices and 2 libraries in Japan. JICST has also set up several cooperative agreements with organizations throughout the industrialized world in order to keep track of the enormous amounts of information available in the world today which JICST collects.

III. Products

A. JICST Online Information Service (JOIS)

JICST's agent for JOIS, the National Technical Information Service, (NTIS) offers JICST database in an online format, known as JICST Online Information Service (JOIS). JOIS contains 22 literature databases and 5 support files. The total number of information items amounts to more than 35,000,000. JOIS issued more than 5,000 passwords.

JOIS contains 22 literature databases and 5 support files with a total number of information items at more than 35,000,000. These files are available in Japanese, but JICST has an English database called "JICST File on Science, Technology and Medicine in Japan which was started in October 1986.

Contained in this file are the following subjects collected from about 4,000 periodicals, technical reports, and conference papers published in Japan: Chemistry, Life Sciences, Medicine, Pharmacology, Civil Engineering and Construction, Mechanical Engineering, Electrical and Electronic Engineering, Systems Control and Management Engineering, Metal Science and Technology, Physics, Energy, and Miscellaneous Technologies. The file size was about 333,000 records in April 1987 with an additional 14,000 records being added each month.

For more information on JOIS, please contact Mr. Tim Feinstein with NTIS at 703-487-4829.

B. Publication Services

JICST offers several publications that catalog information on Japan's science and technology as well as other publications.

1. Current Bibliography on Science and Technology

Extensive periodic publication of Japanese abstracts on 12 different subjects including life science, chemistry and the chemical industry, electronics and electrical engineering, mechanical engineering. Used extensively in Japan in libraries and businesses.

2. Current Science and Technology Research in Japan

Biannual publication providing information on research

projects in progress in public laboratories and research organization in Japan. (English version is available through Mitsubishi International.)

3. JICST Thesaurus

Annual thesaurus covering science and technology. The thesaurus contains over 48,000 terms covering the scientific and technological fields.

4. JICST Holding List

List of JICST's titles and scope of materials.

5. Abstract Journals of Science and Technology in Japan

-Energy Technology in Japan

Annual publication of abstracts and summaries on such topics as electricity, fuels, nuclear energy, solar energy, geothermal, ocean, wind and other alternative forms of energy, energy conversion and energy conservation.

-Electronics and Communications in Japan

Similar to the Energy Tech. Journal, this periodical covers electronic and communication engineering semiconductor materials, solid elements, communication equipment and systems, instruments, robots, and information processing to name a few.

C. Related Services

JICST also offers photoduplication services for requested articles and also offers translation services. In order to receive duplicated materials or translations of articles please contact Mitsubishi.

D. The Latest Information on Science and Technology in Japan.

Using the JOIS database described above JICST conducts a search on 180 different themes every month and distributes a printout of abstracts and short summaries on these themes. Please contact Mitsubishi in New York or San Francisco for a list of the themes.

E. Japan's High Tech Information Service

In cooperation with Nikkan Kogyo Shimbun, JICST sends subscribers the latest information available on one of five different themes including biotechnology, electronics and computer technology, new materials in Japan, Medical and pharmacological technology and robotics. These services are also available through Mitsubishi in New York or in San Francisco.

IV. New Directions for JICST

First, JICST plans to increase the current number of databases, and in order to increase its capabilities with an expanding database, JICST is developing an expert system to coordinate the abstracting and indexing of these inputs.

Second, JICST is working on a dictionary compiling the names and compositions of chemical substances. In conjunction with this dictionary JICST is compiling a list of materials important to research and development.

Third, JICST is improving its online service. Called JOIS-III, JICST plans for it to be operational in 1989.

Finally, JICST is continually expanding its network of cooperation with international organization involved with dissemination of information.

The above information is correct to the best of my knowledge and please contact me if you have any particular questions regarding JICST. I hope that I am able to either answer the question or if not I will certainly be able to obtain a response.

Thank you.

BECOMING AN EDUCATED BUYER OF JAPANESE TRANSLATION SERVICES

Carl Kay
President, Japanese Language Services, Boston, Massachusetts

In recent years Japan has emerged as a world force in many scientific and technical fields. Previously Japan had been recognized for its excellence in commercial applications of technology, for its advanced manufacturing abilities and for certain aspects of its management style. Now, Japan is increasingly at the forefront of many areas of cutting edge and basic research. There is a growing recognition in this country of the need to follow developments in Japan.

Translation of Japanese scientific and technical information into English is a critical part of any effort to monitor research in Japan. My goal here will be to give potential consumers of Japanese translation services a greater awareness of the translation process, the range of translation providers available and the infrastructure of the translation profession.

Translation is essentially a labor-intensive process. Word-processing has of course increased productivity greatly, and there are signs that eventually various machine aids to translation will result in further gains. Basically, though, the process of translation consists of a person, sitting at a desk, reading a Japanese document, trying to understand what the writer of the original document intended to communicate, and then writing an English document, trying to bring that meaning across linguistic and cultural boundaries into a form of use to the final reader or readers. The quality of the resulting translation will depend on the innate skills of the translator, the level of judgment he or she can exercise in each of the many small choices that arise one after another in such a task, and the care that the translator puts into the task. Yes, there are certain aids such as dictionaries and other references, and other people such as editors, who sometimes make valuable contributions to the process. But the key factors in the quality of the resulting translation will be the skill, judgment and care of the individual who sits down and reads the document in Japanese and writes in English.

As consumers of translation, you seek value: a resulting English document of a level of quality appropriate to the need, at the lowest cost that this level can be obtained. With timeliness that meets the situation, with an appropriate level of presentation and mode of delivery.

So, how do the consumers and providers of translation services meet? Let us examine the range of translation providers available. I would call your attention to four main groups. First, there are part-time or occasional translators, who might be students, bilingual engineers or other professionals, housewives or househusbands, etc. These translators are often found through friends, bulletin boards, clubs, etc. Second, there are full-time freelance translators who work as individuals, working both directly for end-users in government and the private sector and also indirectly for them through translation agencies. These freelancers can be located through a directory published by the American Translators Association (ATA) or the newsletter ATArashii (addresses below). The third group consists of specialized one-language or one-field translation

agencies where perhaps some work is done in-house by the translator-proprietor(s) and some by members of categories one and two mentioned above working on a subcontracting basis. These agencies are often listed in local Yellow Pages and tend to be known within the local community and among companies with the most obvious need to employ their services. For example, pharmaceutical companies are obvious sources of referrals of agencies specializing in pharmaceutical translation. The fourth category is multi-language, multi-field translation agencies where again some work may be done in-house but more likely, much is subcontracted to members of any of the three categories above. The larger multi-language agencies can be found by looking in the Yellow Pages of major cities and by referral among your colleagues.

Now, please do not be misled by any notion of ranking of these categories. Translation value for consumers of translation services can be found at any of these levels. In general, the price will be higher when dealing with agencies than when hiring individuals, and the level of service provided by an agency will also be greater than that provided by an individual. For example, an agency will have to figure office overhead into its prices, but this extra cost may be worth the assurance that a wide pool of translators is offered by the agency and that there is someone other than the translator you can speak to if a dispute over quality arises. However, there is a wide range of quality, price and service across these categories, and a smart consumer will examine the options carefully. Be clear about your expectations, and check out potential providers carefully.

When dealing with any of these translation providers, remember that your goal is to maximize the skill, judgment and care that will be brought to bear by the translator to your job (within your budget and timeframe), because that is what will determine the actual quality of the end product you receive. Make sure that any part-time translator you hire does indeed have the language and writing skills necessary to provide an adequate translation. If you hire a full-time freelancer, take steps to assure that this person is indeed a "professional" who possesses the judgment to turn out work to certain minimum standards and will deal with you professionally in matters of price quoting, billing and dispute resolution. The one-language agencies are often run by devoted and skilled translators, but make sure that their business is stable enough to provide you with a predictable level of quality, at an affordable price, over a period of time. If you deal with a large multi-language agency, make sure that they maintain good, friendly and supportive relations with their subcontractors. Too often this is not the case, and the care put into your job will be less than it should if the translator feels underpaid or paid too slowly or otherwise not treated well. No amount of fancy office space or editing will fully compensate for poor work done by the translator. Also, translators need at times to speak directly to the end-user to discuss specific questions in the text. Many large agencies, insecure in their agency role, will not allow any direct communication between

translator and client. This can adversely affect the quality of the translation you receive.

Now I'd like to discuss output and rates. Translator productivity varies widely, but a range of 250-500 words per hour is typical, with perhaps 300 as something of a median. (This is only my own gleanings. Please refer to the American Translators Association for further information). Remember that editing, complicated technical typing, keying and pasteup of figures, and other such operations all add time. Lists of words, such as parts lists, name directories, etc. take longer because there is no chance to build up any rhythm of expression, and more words than usual tend to be nouns requiring checking in a dictionary.

The low end of rates paid to translators of Japanese today is 4 or 5 cents per English word. Many of the better full-time freelancers charge 6 to 9 or 10 cents per word. Agencies tend to charge in a range from 10 to 20 cents per word. Many factors, such as region of the country, affect what an agency charges.

A little multiplying of the per word rate by the output of words per hour shows that good, productive freelance translators earn what freelancers in other comparative professions earn. Also, agencies tend to be charging a markup in line with normal business practices. As in many fields there are always exceptions. However, if you find yourself continually aghast at the cost of translation, you are perhaps still a bit too entrenched in the view that America is the center of the world and that there is not enough value in knowing what is going on elsewhere to merit the cost of paying those individuals who sit at a desk reading Japanese and writing English, exercising their skill, judgment and care.

With an increasing use of fax machines, modems, etc., agencies need no longer hire only local translators, and translation users can hire individuals or agencies all over the U.S. or even the world. I urge you to use the full range of providers available to you with modern technology.

My final topic is the infrastructure of the Japanese translation field.

The importance of translation and the role of translators are well established in Europe, where so many languages coexist within a relatively small area. The same is true for Canada, where bilingualism is a major political and social force, and in Japan, where the economy depends on exports to countries that do not use Japanese. In all of these parts of the world there are numerous professional organizations of translators, translator training programs, certification programs, etc. In the U.S. the translation field has been slower to develop, but there is some structure in place.

In the U.S. the focus of the translation profession is the American Translators Association (ATA) located at 109 Croton Avenue, Ossining, NY, 10562 Tel 914-941-1500. The ATA is a 28 year old organization and currently has a membership of about 2,500 translators (mostly working with French, Spanish, Russian and German, though most languages are represented), agency owners, and translation buyers including corporate librarians,

officials from government, members of international organizations, etc.

Until 15 years ago, Japanese translators in this country were fairly rare, consisting mainly of those who had learned Japanese as part of the war effort in the 1940's. Now, however, the Japanese Translators subgroup of the ATA is growing rapidly in size and in its range of activities. This year's annual ATA convention is in Albuquerque from October 8-11, and the Japanese group as well as the organization as a whole have many exciting programs planned. I will be moderator of a panel on the topic of Japanese scientific and technical information which will include two speakers from this 1987 SLA panel on the same topic. The convention is an excellent way to meet translators and learn about the translation process and industry. The ATA also publishes a useful directory of translation providers and can give phone referrals.

The ATA offers accreditation tests that establish minimum standards of professional competence for translators. In October of 1986 a test for Japanese-to-English was added to the other tests offered. While these tests alone do not measure advanced proficiency, it should be noted that the pass rate is below 50%, so ATA accreditation is certainly one useful criterion in selecting a translator. The ATA is in the process of developing a program of more advanced testing in specialized areas, for example, Japanese-to-English pharmaceutical materials.

As an outgrowth of my work in the ATA Japanese group, I now publish a newsletter on the subject of Japanese translation called **ATARASHII**. Published quarterly, it includes glossaries, articles about new technology affecting translators, translation problems and other topics of interest to translators, translation buyers and others in related fields. It includes a directory of translators as well as notices by companies and agencies seeking Japanese translators. The newsletter maintains a close relationship with translation publications in Japan and Europe. Subscriptions are \$35/year and are available, along with sample copies, from Japanese Language Services, 186 Lincoln Street, Boston, MA, 02111 Tel 617-338-2211.

In closing I would like to urge all consumers of translation to learn as much as possible about the translation process, the range of translation providers available and the issues affecting quality and value in translation work. We translators will in turn continue to develop our judgment as professionals, and working together we can perhaps meet the challenges ahead in understanding what is going on in Japan and what that means for our country. I look forward to this exciting partnership.

**TRANSLATION OF JAPANESE STI--THE MULTILINGUAL
TRANSLATION AGENCY PERSPECTIVE**

Hannah Feneron
Leo Kanner Associates

In the fifteen years I have worked in the translation business, the demand for translations of Japanese scientific and technical information (STI) has increased dramatically, in both the private sector and government. I would like to discuss this growth from the perspective of a multilingual translation agency, and talk about some of the problems encountered in meeting current and future needs for the translation of Japanese STI.

Leo Kanner Associates was formed as a multilingual translation agency in 1960. I have been involved in all aspects of managing the agency, and one of the most difficult areas over the past decade has been the performance of Japanese scientific and technical translations. The main problems have been the following:

1. The ever-increasing volume of work. The demand from both private-sector clients and government clients for Japanese translations is steadily increasing, and no leveling off is in sight.

2. The difficulty in recruiting Japanese translators. There are several aspects to this problem, particularly a lack of training programs for Japanese translators, the fact that Japanese translations take longer to complete than Western-language translations and often need more editing.

3. The pricing of Japanese translations. Since a Japanese translation costs much more than a Western-language translation, some clients, above all government clients, find it a financial burden to order much translation work from Japanese to English.

Increasing Work Volume

In the early 1970s Leo Kanner Associates was awarded multilingual translation contracts by the Department of the Army, the Air Force, and NASA Headquarters. At that time the principal sources of STI the government was interested in were documents in Russian, German, and French. Only about 10 percent of our translation effort for the government and for private clients was from Asian languages, namely Japanese, Chinese, and Korean. We dealt with three or four Japanese translators, and we had enough work to keep only one of them busy more or less full-time. Among our private-sector clients requests for Japanese translations were few and far between--amounting, I would estimate, to about 1 percent of our work.

Today the situation is altogether different. In the past three years the volume of Japanese STI we have handled has averaged 30-40 percent of our total translation volume; this year it is approaching 50 percent. What is surprising about these percentages is that they are true not only for our government clients but for our private-sector clients as well. Equally surprising is the fact that the volume of Japanese STI we translate for Department of Defense (DoD) clients has not

increased--it is still about 10 percent, the same as in the early 1970s.

The reasons for the increased demand for translation of Japanese STI are well known, and I will not go into them here. As for the lack of increase in Japanese translation for the DoD, I assume that the main reason is lack of funding, since Japanese translation is traditionally the one big-ticket item in our pricing structure in the government contracts we bid on.

The subject areas of most interest to our clients who request Japanese STI translations are the same for both the government and the private sector: engineering, particularly electronic and semiconductor engineering; computer-related subjects, primarily hardware; military-related subjects, for our DoD clients; and chemistry, particularly polymer chemistry. Other scientific and technical subjects are requested, too, but the bulk of the work is in these four areas.

In 1986 Leo Kanner Associates translated about 20 million words. A review of the year's translation volume in Japanese STI and of the subjects of interest to our clients is as follows:

1. About 35-40 percent of the work for private clients involved translation of Japanese STI. Besides the subject areas mentioned above, clients were interested in power engineering and pharmaceuticals, and showed a growing interest in biotechnology.
2. About 15-20 percent of the translations ordered by NASA Headquarters were Japanese: reports from the Japan Space Agency, articles on propellant technology, and a number of translations on ceramic technology for an ongoing study by NASA Lewis Research Center.
3. The Department of the Army ordered a large number of book-length translations and article translations from Russian and German, but only about 10 percent of the translation volume in Army contracts was Japanese. Some of the Japanese work was in military subjects, of course. We also handled a great deal of material in laser technology, magnetohydrodynamics, and power engineering.
4. The amount of Japanese translation we have done for the U.S. Air Force has historically been less than 10 percent of the total volume, and it did not increase in 1986. The subjects have almost exclusively to do with aviation and rocketry, and occasionally naval technology. These translations are done for the U.S. Air Force's Foreign Technology Division, which has a foreign technology data base, CIRC II, which many of you may be familiar with. For the past ten years we have been providing translations for this data base, consisting of extracts or abstracts from open-source literature, primarily books and periodicals.

5. Finally, there is the work we do under a Department of Commerce contract with the U.S. Patent and Trademark Office. This work makes up the bulk of our Japanese STI translations. About 60 percent of the patent documents the U.S. PTO sends for translation are Japanese patents and patent applications. Five years ago the proportion was only about 25 percent. The subjects of these documents encompass every patentable technology under the sun, from nuclear power generators to tofu recipes. We are currently translating 40 to 60 Japanese patents or patent applications a month under this contract.

These, then, are the main subject areas. Most of the Japanese STI we translate for the government is fairly recent material. Patent Office documents are of course a special case; Patent Office requests for Japanese patent translations encompass every conceivable topic, and the originals go back as far as the 1930s; the Japanese patents we are currently translating are mostly from the late 1970s.

NASA's translations are typically requested and translated about a year and a half after publication. We have been asked to translate much older material from time to time, notably at the start of the ceramic technology study. During the research and development of the tiles for the Space Shuttle, we began to see a great deal of material related to Japanese fine ceramic technology, some of it dating back twenty years or more.

By far the most current Japanese STI comes to us from the Department of Defense. Although the volume is small, DoD clients appear to be able to acquire Japanese STI documents quickly, and they like to have them translated quickly, often within a year of the initial publication. In particular, the translations done for the Air Force's CIRC II data base are usually completed and ready for users of the data base within six to eight months after publication of the Japanese journals. We are currently translating extracts from several Japanese journals that were published in Japan in December 1986 and January 1987. The translations will be completed in about two weeks, and the Air Force will enter the work in its data base within the next six weeks.

The ever-increasing volume of Japanese STI translation has led to changes in the translation industry. Japanese translators were the first in the industry to buy and use word processors or computers. Western-language translators have had the luxury of being able to dictate their translations, since the structure of most Western languages is such that they lend themselves to a more direct translation than Japanese does, and with minimum editing. The structure of written technical Japanese forces virtually all Japanese translators first to create a rough draft and then to edit that draft into acceptable English. The instant editing capability of word processors and computers has drastically cut the time required to produce a final draft of a Japanese translation. Japanese translators have also been the

first to use modems and facsimile copiers to transmit their work in order to save time.

From the client's perspective, any technology that gives a faster turnaround is welcome. Traditionally a client has mailed us a document to be translated and we have mailed back a hard copy of the translation. A 10,000-word Japanese document handled in this fashion usually takes ten working days to be processed through our office, translated, edited, typed, and mailed to a client.

Most of our private-sector clients have begun sending us foreign language documents for translation via facsimile copiers; this works well for Western languages, but until a couple of years ago telefax transmission of Japanese texts was unsatisfactory. Unless the original type was large and the original document was really an original and not, for instance, a third-generation photocopy, telefax transmission of Japanese text usually produced unreadable copy. The technology has recently improved a great deal, and I expect that telefaxing Japanese documents for translation will become standard for most of our private clients.

Last year the Air Force's Foreign Technology Division instituted a new procedure in its extract translation contract, namely the method of delivering the work. FTD now requires its contractors to send the translations in ASCII text files on floppy disks. Using a PC-to-mainframe conversion program, FTD can input the translations in the CIRC II data base within four to six weeks of receiving the work. This procedure is a tremendous time saver in terms of inputting the data, and I would expect other government clients to go this route within the next few years.

Recruiting Japanese Translators

From the perspective of a private-sector translation agency, the main problem in dealing with the increasing requests for translation of Japanese STI is that there simply are not enough Japanese translators to fill the need. Recruiting Japanese translators is an ongoing task.

There is a severe shortage of qualified translators who can handle Japanese STI. The study of Japanese is rigorous and time-consuming, and it is rare enough to find a native English speaker who has mastered the Japanese language. The opportunity to study translation techniques for Japanese is virtually non-existent in this country. And even when someone has acquired fluency in Japanese and taken translation courses, he is still faced with the biggest obstacle of all: he generally has no first-hand knowledge of or schooling in scientific and technical subjects.

The ideal applicant for a position as a Japanese translator would have the following qualifications: (1) at least five years'

formal study of the Japanese language, (2) one to three years' residence in Japan, (3) at least one or two years' experience translating Japanese to English, and (4) a background in a technical field, preferably in one of the four areas mentioned earlier.

The real applicant usually fulfills only the first and possibly the second requirement. How can we hope to fill the need for qualified Japanese STI translators?

At Leo Kanner Associates we spend a large amount of time training Japanese translators and editing Japanese-to-English translations, with very little to show for our efforts financially or otherwise. Our experience is that it takes a novice Japanese translator one to three years to become efficient and effective at his job. Since all the translators work as free-lancers, who are paid by the word, most inexperienced translators do not have the time or the financial resources to work in a trainee situation. Their pay rate is the same as that of more experienced translators, but the amount and quality of work they produce is much lower for the first year or two.

At present we use the services of about seventeen free-lance Japanese translators, seven of them more or less full-time, the others part-time. A good full-time Japanese translator can translate about 3,000 to 4,000 words a day, or ideally, about 700,000 to one million words a year. This rate of work is about 25 percent lower than that of full-time Western-language translators, precisely because of the difficulties presented by the written Japanese language.

Using native speakers of the source language to translate into English is a practice that most U.S. translation agencies have traditionally avoided. As good as a native Japanese speaker's English may be, it is usually not good enough to produce a good-quality translation. At Leo Kanner Associates we have had some success in hiring translator teams, where one member of the team is a native Japanese speaker and the other is a native English speaker with some knowledge of Japanese.

Donald Philippi, the dean of West-Coast-based Japanese translators, has advocated for years an apprenticeship program, whereby beginning Japanese translators would be paid for learning and their work would be edited by more experienced translators. To my knowledge, no translation agency and certainly no government agency has money budgeted for this kind of program. Don has been training translators informally by this method for a number of years, without asking financial reimbursement.

Translation is by nature a solitary profession. The translator works alone with his dictionaries and his typewriter or computer, with only occasional contact with other translators. Among Japanese translators in the San Francisco Bay Area, however, networking has recently become a reality, again thanks

to the efforts of Don Philippi. There are informal meetings every two or three months attended by many of the Japanese translators in the area; often guest speakers are invited; always there is a great deal of information exchanged. The Bay Area translators are also becoming adept at telefaxing doubtful terminology or translation problems to their colleagues for solutions.

One of the main problems for virtually all Japanese translators of STI is that they have had to spend so much time and effort mastering the Japanese language that they lack the knowledge of Western technology and terminology that is characteristic of other translators; they have simply not had time to study or do reading in areas that most Western-language translators take for granted. I have a rudimentary knowledge of Japanese, and I can read katakana terms; still I am surprised that I often have to help Japanese translators with Western proper names, Western company names, chemical names, trademarks, and so forth. As a result of such experiences, I have made available in our office library a wide range of English-language periodicals in technical subjects such as aviation, computers, and electronics, and I urge all translators to read extensively in their target language whenever possible.

A continuing difficulty in all translation work is the lack of feedback, particularly from government clients. Many of the government agencies we work with have their own in-house translators, many of them with a great deal of experience in the subject matter. But obtaining feedback from the government is virtually impossible. The government translators are usually working on "rush," high-priority projects and simply do not have the time to answer terminology or phraseology questions that might arise. Sometimes the translators feel as if they are working in a vacuum, and they become discouraged because they are sure no one is reading or using their work.

Pricing Problems

Leo Kanner Associates translates about 75-100 book-length documents from Russian and German each year. Last year we translated three Japanese books, a fairly typical output. All three were translated for government clients. The main reason for the disparity is surely the cost of translating Japanese as compared with the cost of translating a Western language.

You are probably aware of the government contracting policy of awarding contracts to the lowest qualified bidder. Since most of the translation work that is done in the United States is done for the U.S. government, it is a fair assumption that the agencies and translators performing the work are paid at the lower end of the scale. Over the past three years the government has typically paid translation agencies between three and seven cents a word; wages to the translator have averaged two to five cents a word. Compare this with private-sector translations,

where the translator is paid a minimum of five or six cents a word and often much more.

The pricing structure of most government contracts involves separate pricing for each language, and Japanese translation, as a scarce commodity, is generally the highest priced of the languages commonly requested. Our current charges to the government for Japanese translation are anywhere from 25 to 75 percent higher than our charges for Western languages. The variables we consider in determining our prices when bidding on a multilingual government contract that includes Japanese are (1) quantity of Japanese work, (2) time frame allowed for doing the work, and (3) technical complexity of the work.

Were a full-time Japanese translator to work exclusively on government translation contract documents, his monthly gross income would be in the neighborhood of \$2,500; after taxes and expenses I would estimate his net income to fall in the range of \$1,800-1,900 a month.

I have already mentioned that Japanese translators must of necessity work more slowly than their Western-language counterparts, and they must generally have invested a far greater proportion of time studying the language. In addition, Japanese dictionary costs are enormously high, especially when it comes to specialized dictionaries. Whereas a Western-language translator may typically spend no more than \$500 a year on dictionaries and other reference books, a Japanese translator can spend several thousand dollars.

Because of the rates of pay, Japanese translators tend to avoid government-contract work--and even to some extent U.S. private-sector work--and instead work full- or part-time for clients or agencies in Japan at rates of pay that until recently at least were 50 to 100 percent higher than those paid in the United States. The advent of good-quality facsimile equipment has made it easier for agencies in Japan to work with U.S.-based translators, and many translators, especially on the West Coast, in fact are now working virtually exclusively for Japanese agencies.

* * *

This paper has touched on some of the problems faced by a multilingual translation agency in dealing with translating Japanese STI to English. I am eagerly awaiting the first report of the Secretary of Commerce on the implementation of the Japanese Technical Literature Act of 1986; I am particularly eager to see the directory of programs and services in the United States that collect, abstract, translate, and distribute Japanese STI. I believe that the more all of us involved in the dissemination of Japanese STI know about one another, and the more information we share, the better the chance we will have of solving the kinds of problems described here.

ACCESS TO JAPANESE SCI/TECH LITERATURE -- THE USER'S PERSPECTIVE

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Renfrew, the managing director of Reuters once said "The faster and further you move information the more valuable it becomes." I have often thought this could be applied to timely information from Japan in high technology areas. In getting into this arena you must acknowledge that it is not going to be inexpensive. There are significant costs involved -- labor costs in identifying the material, high purchasing prices for subscriptions and document delivery, and the most obvious cost --that of translating Japanese to English. With a growing market for this kind of information we should see costs fall but for the present the costs remain high. Over the past 2 years I have seen a good deal of progress in making this type of information more available. When I first began my search for Japanese material there was very little available through the regular channels we, as information specialists, are used to dealing with. Abstracting and indexing tools, either print or machine readable, included minimal Japanese language material. Specialized indexes for Japanese material were nonexistent. With the advent of UMI's JAPANESE TECHNICAL ABSTRACTS in print and online, this has begun to change. Other indexes have increased their coverage of Japanese language material. Even more noticeable is the proliferation of a variety of 'digest' type publications which report in English on developments in Japan usually in highly technical areas. This is a burgeoning market -- English speaking scientists and engineers needing to keep abreast of developments in Japan. At last we are seeing an awareness of this need here in the U.S. -- slow as it has been. In the late 50's we saw a similar situation with respect to Soviet literature and the Sputnik race. Suddenly the U.S. realized a need for timely access to the Russian literature. We saw an increase in the amount of Soviet literature being included in the printed abstracting and indexing tools and the emergence of cover-to-cover translations of Russian journals.

A similar situation seems to be upon us now. The Federal government has held Congressional hearings in 1984 and 1985 to address the issue. We have seen the passage of the Japanese Technical Literature Act of 1986 although little real action. The private sector is becoming more interested in this area, hence the emergence of a number of new services such as the 'digest' type publications I have made mention of already. At the State level, there is a California legislative initiative to address the need to make access to foreign technical literature, in particular Japanese, more available to industry, possibly through a joint venture of the University of California and the State. So whilst some progress is being made there is still a long way to go.

In addressing the issue of access to Japanese information there are obviously 3 major areas as I see it:

1. How to find out what is currently being published in Japan in one's particular area of interest
2. Once identified, how to get it in hand

3. Once in hand, how to assess its usefulness before expending the considerable sums of money needed for translation.

One of the first problems in tracking the Japanese literature is the enormity of the task. The Japanese are prolific publishers. There are over 10,000 serial publications pertaining to science and technology alone. The majority of the publications are not included in the bibliographical tools we most commonly use. Unlike the U.S., in Japan there is no system of refereed journals. A common pattern might be to publish the article first in a house organ -- a quick form of communication. This can be published again in a more commercial type of publication, possibly in English but more likely in Japanese. It can appear yet again albeit 12 or even 18 months later, in a journal published outside Japan, oftentimes as part of the proceedings of a conference when the paper is presented at an international meeting.

The format of Japanese journals ranges from being completely in Japanese, to those with an English language Table of Contents possibly with English abstracts, to a mixture of both Japanese text and English text. It is the quick form of communication in Japanese which will yield the most timely information, but is the most difficult to deal with. In order to comprehensively track Japanese technical literature one must be aware of the important role the Japanese government plays in co-operative research efforts in Japan. Hence, one needs to be aware of government report literature and report literature from major Japanese universities, since companies are often involved in joint research efforts with government and academe.

A somewhat worrisome trend seems to be that the Japanese are less concerned about publishing their research in English. This is possibly related to the emergence of Japan as a nation concerned with basic research efforts. Their reputation has been established --they no longer need to prove themselves, gain acceptance if you will, as a serious contender producing major technical breakthroughs. This, I hasten to add, is observation. I am unaware of any studies which have documented this trend.

The most obvious problem of course, remains the Japanese language itself. There is a paucity of competent translators of Japanese technical literature. One cannot assume that a native Japanese speaker will be able to read the highly technical article you have in hand. Language expertise for the romance languages, at a level sufficient to provide an understanding of the content of a paper, can be found in most companies and universities. This is not generally the case for Japanese. While large numbers of Japanese delegates attend and participate in conferences here in the U.S., the same cannot be said for our own scientists and engineers. Japanese is a difficult language. At North Carolina State there is a program which attempts to teach technical Japanese to Engineering students. This represents one approach but certainly will not yield a noticeable improvement in increasing

the scientific community's expertise in the Japanese language for many years to come.

Perhaps the most basic need for information professionals is locating sources of Japanese Sci/Tech information. Just what is out there in your particular field of interest? I am going to first deal with the secondary sources -- the directories, indexes, databases and guides -- the signposts into the primary literature if you will, and then look at methods to acquire the primary literature. If I can put in a commercial here, I'd like to mention the annotated bibliography to sources of Japanese Sci/Tech literature which I hope to complete some time next year.

A valuable source of information can be found in the published proceedings of seminars and meetings dealing with access to Japanese Sci/Tech information. There have been a number in the past few years, particularly those sponsored by the British Library's Science Reference Division. They will be sponsoring, along with NTIS and JICST, the First International Conference on Japanese Information in Science, Technology and Commerce, this coming September. The published Congressional Hearings which I have alluded to earlier, also provided me with a wealth of information about sources of Japanese information, gleaned from the experts who testified at those hearings.

In order to familiarize yourself with the major journals published in Japan, collect any lists of Japanese journals. The 2 major suppliers, Maruzen and Japan Publications Trading Company produce catalogs which are very useful. The most informative listing is that from the National Diet Library in Tokyo. It is published every 5 years or so and covers the major scientific & technical journals. It gives the title in Japanese characters as well as the transliterated title and the English title if there is one. ISSN, issuing body and other pertinent information is also included. This is invaluable for verifying citations and unraveling the mysteries associated with variant forms of translated titles.

Coverage of Japanese material in abstracting and indexing services has improved. Chemical Abstracts has always been fairly good. INSPEC and its printed equivalents have been noticeably increasing their Japanese coverage over the last couple of years. Tom Satoh will speak about JAPANESE TECHNICAL ABSTRACTS and its online equivalent. University Publications of America has released the first issue of its abstracting and indexing journal titled JAPAN COMPUTER TECHNOLOGY AND APPLICATIONS ABSTRACTS which purports to cover the Japanese computer industry in depth. Obviously there will be some overlap with JTA. JICST, Tokyo publishes ABSTRACTS OF SCIENCE AND TECHNOLOGY IN JAPAN. This is published in a number of separate sections and is in English.

Other Online sources include JOIS (JAPAN ONLINE INFORMATION SYSTEM), the major Japanese science and technology database produced by the Japan Information Center for Science and Technology

(JICST). Until recently this database was completely in Japanese and accessible only in Japan. JICST has now made this available in the U.S. through NTIS and some translation into English has occurred. Bibliographic references for Japanese publications from 1985 have been translated and abstracts are being translated in a phased operation. By 1988 about 20% of the references will have English language abstracts. Mitsubishi offers a subscription service to a printed SDI service from the JOIS database. There are 180 subject profiles to choose from at this time.

The full text online service NEWSNET, now offers a number of Japanese newsletters -- important sources of current information from Japan. Amongst the more general titles are JAPAN WEEKLY MONITOR, KYODO ENGLISH NEWS SERVICE and of the industry specific newsletters --JAPAN COMPUTER INDUSTRY SCAN, JAPAN SEMICONDUCTOR SCAN and JAPAN HIGH TECH REVIEW. Another service is COMLINE, a full text information service from Tokyo which delivers timely reports on recent developments in Japan's high tech areas. This material tends to be more business and product oriented but there still is a good deal of research and technical information included. This is an interesting service in that the reports are delivered via electronic mail each evening from Tokyo to your Personal Computer. The reports have been written by a team of Japanese reporters using a variety of sources such as government, university and private publications, trade journals, industry contacts, press releases and newspapers. These reports, checked carefully for their accuracy are then translated by British and American technical translators. The subscription covers the search software, allows you use to select from the downloaded material. Once you subscribe, the downloaded information is considered yours, i.e. you are then free to retain it permanently, disseminate it, or publish it. [Since the SLA meeting this service is now accessible via Predicasts' PTS PROMT file].

Another valuable source of information, particularly for volatile, high profile industries is the Patent Literature. This is often the earliest announcement of new technology. JAPIO, the online database from the Japanese Patent Office is available through Pergamon Orbit Infoline here in the U.S. This database is in English. Newspapers, in particular the English language versions of Japanese newspapers, are very useful, particularly for business type information. As well as the more general newspapers there are a number of specialty newspapers covering particular areas such as the electronics industry.

In order to obtain copies of the original Japanese documents you will need to identify locations which are strong in Japanese language material. The collections of U.S. libraries are surprisingly weak when it comes to science and technology in the Japanese language. Many East Asian collections focus on political and social science materials. The Library of Congress' Japanese collection is certainly stronger in the social sciences and humanities. Current budgetary restraints make it impossible for them to address the perceived need for more Sci/Tech coverage.

They do not have a printed list of their holdings but of course do show their holdings in OCLC. The Center for Research Libraries is a useful source for those of us who hold membership and thus are entitled to use their document delivery service. The British Library Document Supply Centre is of course an excellent source. Linda Hall Library in Kansas City, a private science and technology library does have a good collection of Japanese journals. Their document delivery service is efficient and inexpensive. Their holdings are available in a printed listing and are also listed in OCLC. Other universities with Japanese programs are worth checking such as North Carolina State and M.I.T. JICST, Tokyo also offers a document delivery service for material held in their collection. We are now experimenting with sending our requests via the Japan Technical Information Reference Service at George Mason University, VA since they can transmit our requests electronically to JICST. JICST also offers a contents page service from journals received by the JICST library. UMI and University Publications of America both offer a document delivery and translation service to complement their abstracting and indexing service. JAICI (Japan Association for International Chemical Information) has recently been added to DIALOG's DIALORDER system as a supplier of translations of Japanese patents and other scientific and technical articles. A copy of the original article is also provided but it doesn't appear they will supply original articles without translation. Given the paucity of good Japanese collection you may need to subscribe to a number of Japanese journals. For those titles completely in Japanese which we subscribe to, we translate the Tables of Contents.

Lest you think that all the problems are solved let me point out a couple of unique problem areas. In dealing with translated titles, the terminology may differ depending on who did the translation, i.e. your translated title may not match exactly with the translated title in the printed abstract or online database. Searching on keywords therefore becomes increasingly serendipitous. The only certain match is by using the original Japanese characters. In order to verify a match you often need to correlate journal name and actual pagination. Personal names are particularly difficult. One can never be sure you have transliterated the name correctly unless you are aware of the way the author pronounces his name, since Japanese is a phonetic language. Other little traps for the uninitiated -- searching on a name like "Suzuki" which in Japan is very common. Journal names can also be transliterated differently by different sources, particularly those relating to symposia, conferences, meetings and the like. Often, as I mentioned before, the same paper can appear in different journals. Before commissioning an expensive custom translation it is wise to search for an English language version.

Once you have the original in hand and it is in Japanese, what should you do? First, be sure to show it to the requestor. He may be able to glean enough information from the tables, graphs and charts which use the universal language of numbers. The list of references at the back of the paper will often cite some English

language papers -- perhaps these will be useful. Don't overlook in-house expertise, since there may be someone who can give you at least a rough idea of the content. This can be very important in deciding whether the content of the paper justifies the expense of custom translation. If you still need to obtain a full translation of the article, start by checking the lists of available translations -- World Transindex (WTI) and Translation Register-Index (John Crerar). The Institute of Metals, London, produces weekly lists of translations available through their MI Translations Service. In my experience these listings generally do not include translations which are recent enough to be of use to us. This will certainly differ depending on the field you are working in.

Machine translation is another whole area which I will not spend time on here except to say it is worth watching. This has been used, particularly by some government agencies to get an indication of the content of a paper. The accuracy rate for machine translation of Japanese to English is still only about 50% compared to a 90% accuracy rate for European languages. There is considerable progress being made in Japan on machine translation systems.

When none of the above will suffice, custom translation is the next step. Be prepared to pay on average \$300-600 for an average article of 8 Japanese pages. For those used to paying \$15-20 to a document supply company for an English language paper this certainly seems exorbitant. Even with the discounted rates we have negotiated, we spent \$22,000 on translation costs in a 12 month period. There are a number of agencies here in the U.S. offering translation services from Japanese to English. Prices are usually quoted on a completed English page basis. Do not confuse this and assume a Japanese page equates to an English page. A rule of thumb is a 1:3 ratio. Be sure you know what you will be receiving as the final product. Ask for a sample of their work since format can be important. How do they plan to treat graphic material? Will it be interspersed throughout the text, following the original format or collated at the end of the translated text? Does it matter to you? Do you want author biographies translated? What about the list of references? What are the qualifications of the translators? Are they native Japanese or English speakers? Do they have a sound technical background pertinent to the material they will be translating? Is the translation checked by someone other than the translator for readability? Is confidentiality a concern? Are you concerned with consistency? We have prepared our own glossary of technical terms to maintain consistency when using a number of different translators. Very importantly, what can you expect the turnaround time to be? Be prepared to pay more for rush work. For our own situation we have contracted directly with a couple of freelance translators in Tokyo as well as using the services of translation agencies here in the U.S.

These are just some of the issues involved in translating of Japanese technical material. Due to the high costs involved it

will remain a problem area for many of us. We can hope that Government initiatives may help to alleviate some of the problems, possibly by injecting more money into developing machine translation systems which would lower costs, subsidising private sector initiatives and providing budget allocation to agencies such as NTIS to increase what they can do to unlock the wealth of Japanese resources we are just starting to become aware of.